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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/738,399	12/17/2003	Sang Tae Ahn	CU-3495 RJS	8008

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EXAMINER

LEE, CALVIN

ART UNIT	PAPER NUMBER
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2818

DATE MAILED: 02/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No. 10/738,399	Applicant(s) AHN et al.	
	Examiner Lee, Calvin	Art Unit 2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 17-23 is/are allowed.
- 6) ☒ Claim(s) 1-2,4-7,13-15 is/are rejected.
- 7) ☒ Claim(s) 3,8-12 and 16 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05/21/04</u> . | 6) <input type="checkbox"/> Other: ____. |

OFFICE ACTION

Specification

1. The specification is objected to because of the following informality:
Page 1 line 24, replace "an flowing SOD" with --a flowing SOD--

Claim Objections

2. Claim 17 is objected to because of the following informality:
Claim 17, line 11, replace "the precise flowing insulating" with --a precise insulating--

Claim Rejections - 35 U.S.C. § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 4-7, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al (US 4,952,524)* in view of *Lee et al (US 2003/0124465)*.

Lee et al discloses a method for fabricating an isolation layer in a semiconductor device:

- providing a semiconductor substrate on which a trench is formed;
- forming a flowing insulating layer 25 below the trench; .
- forming a nitride film 23 and an oxide film 21 at an inner surface of the trench, wherein the oxide film is formed by oxidizing at approximately 850°C with a thickness between 100-400Å
- making the insulating layer precise by carrying out in an atmosphere of either nitrogen or oxygen at a temperature of between 850°C and 950°C for up to 2 hours, or by a rapid thermal anneal at 1000°C for 30-60 sec [col. 5, ln.13]

Lee et al'524 does not disclose forming a precise insulating layer on the flowing insulating layer. *Lee et al*'465 discloses TEOS or HDP oxide layer 20 formed on a flowable insulating layer or USG layer 19, which has been formed using SiH₄ [Fig. 3 and ¶ 0020-0021].

It would have been obvious to one having ordinary skill in the art to have modified the structure of *Lee et al*'524 by utilizing an insulating layer on top of the preformed flowing insulating layer for the purpose of preventing losses of the flowing insulating layer.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Lee et al* in view of *Lee et al*, as applied to claim 1, and further in view of *Applicant's Prior Art (APA)*.

None of the *Lee et al* references discloses a step of carrying out a pretreatment prior to forming the flowing insulating layer. *APA* discloses "a plasma treatment is performed with using a N₂O or O₂ plasma, before forming the SOD insulating layer" [page 3].

It would have been obvious to one having ordinary skill in the art to have modified the process of both *Lee et al* by utilizing a cleaning treatment of a trench for the purpose of removing residues left behind after the trench formation.

Allowable Subject Matter

6. Claims 3, 8-12, and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. None of the cited arts teaches or suggests the claimed parameters of pre-cleaning the trench (in re claim 3); the flowing insulating layer comprising SHO (in re claims 8-11); the claimed parameters of post-cleaning the flowing insulating layer (in re claim 12); and the claimed parameters of post-heating the precise insulating layer (in re claim 16).

Claims 17-23 are allowed because the cited arts are silent about forming a thermal-insulating layer above an insulating layer, which is formed on an upper surface of whole structure on which a precise insulating layer is formed.

Contact Information

7. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 from 7:00AM to 5:00PM (Monday-Thursday, Eastern Time). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *David C. Nelms* can be reached at (571) 272-1787.

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The central fax number is (703) 872-9306 for all communications to be entered (e.g., amendments, remarks, IDS, etc.)



February 10, 2005


David Nelms
Supervisory Patent Examiner
Technology Center 2800